

CLAIMS

1. A black composition comprising as indispensable components a titanium nitride oxide, a resin and a solvent; X-ray intensity ratios R_1 and R_2 represented by the Equations (1) and (2) below, respectively, satisfying the relationships represented by Formulae (3) and (4) below:

$$R_1 = I_3 / \{I_3 + 1.8(I_1 + 1.8I_2)\} \quad (1)$$

$$R_2 = I_2 / I_1 \quad (2)$$

$$R_1 > 0.70 \quad (3)$$

$$0.85 < R_2 < 1.80 \quad (4)$$

wherein I_1 represents the maximum diffraction intensity of the titanium nitride oxide when the angle of diffraction 2θ , determined by using $\text{CuK}\alpha$ line as the X-ray source, is 25° to 26° , I_2 represents the maximum diffraction intensity of the titanium nitride oxide when the angle of diffraction 2θ is 27° to 28° , and I_3 represents the maximum diffraction intensity of the titanium nitride oxide when the angle of diffraction 2θ is 36° to 38° .

2. The black composition according to claim 1, wherein said X-ray intensity ratio R_1 is not less than 0.80.

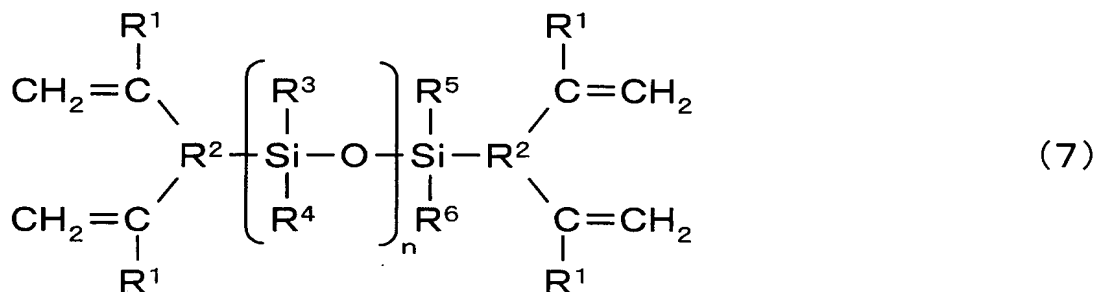
3. The black composition according to claim 1 or 2, wherein said solvent has a boiling point of 120°C to 180°C , and a viscosity of $3 \text{ mPa}\cdot\text{s}$ to $10 \text{ mPa}\cdot\text{s}$.

4. The black composition according to any one of claims 1 to 3, wherein said resin is at least one selected from the group consisting of an acrylic resin and a polyimide resin.

5. The black composition according to any one of claims 1 to 4, further comprising an organosilane hydrolysis condensate.

6. The black composition according to any one of claims 1 to 5, further comprising a compound having a siloxane bond and a carbon-carbon double bond in a single molecule and having no silanol group.

7. The black composition according to claim 6, wherein said compound having a siloxane bond and a carbon-carbon double bond in a single molecule and having no silanol group has the structure represented by the following Formula (7):



5 (wherein each R^1 independently represents hydrogen or alkyl group; each R^2 independently represents an organic group containing amide bond, imide bond, ester bond or urethane bond; R^3 to R^6 independently represent alkyl group; and n represents an integer of 1 to 3.)

8. The black composition according to any one of claims 1 to 7, wherein the
10 weight ratio of said titanium nitride oxide to said resin is within the range between 75/25 and 60/40.

9. The black composition according to any one of claims 1 to 8, further comprising carbon black.

10. A black composition according to any one of claims 1 to 9, wherein the black
15 coating film obtained from said black composition according to any one of claims 1 to 9 has an optical density (OD value) of not less than 4.4 per 1 μm of film thickness, and wherein the minimum exposure energy required for photo-curing is not more than 60 mJ/cm^2 .

11. A black coating composition comprising as indispensable components a
20 titanium nitride oxide and a resin; X-ray intensity ratios R_1 and R_2 represented by the Equations (1) and (2) below, respectively, satisfying the relationships represented by Formulae (3) and (4) below:

$$R_1 = I_3 / \{I_3 + 1.8(I_1 + 1.8I_2)\} \quad (1)$$

$$R_2 = I_2 / I_1 \quad (2)$$

$$R_1 > 0.70 \quad (3)$$

$$0.85 < R_2 < 1.80 \quad (4)$$

5 wherein I_1 represents the maximum diffraction intensity of the titanium nitride oxide when the angle of diffraction 2θ , determined by using $\text{CuK}\alpha$ line as the X-ray source, is 25° to 26° , I_2 represents the maximum diffraction intensity of the titanium nitride oxide when the angle of diffraction 2θ is 27° to 28° , and I_3 represents the maximum diffraction intensity of the titanium nitride oxide when the angle of
10 diffraction 2θ is 36° to 38° .

12. The black coating composition according to claim 11, wherein said X-ray intensity ratio R_1 is not less than 0.80.

13. The black coating composition according to claim 11 or 12, wherein said resin is at least one selected from the group consisting of an acrylic resin and a
15 polyimide resin.

14. The black coating composition according to any one of claims 11 to 13, wherein the weight ratio of said titanium nitride oxide to said resin is within the range between 75/25 and 60/40.

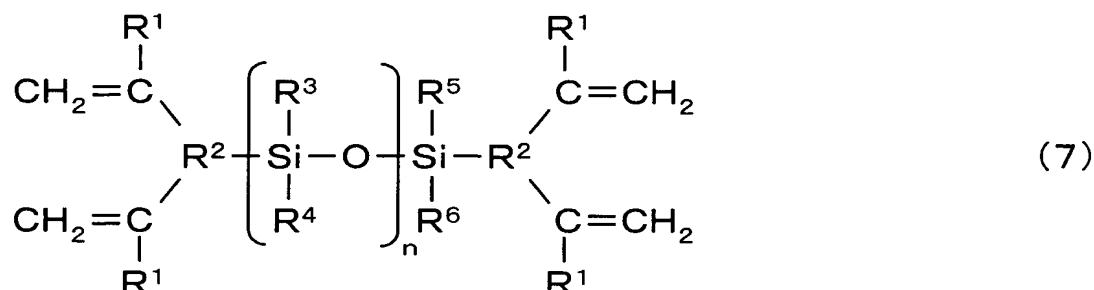
15. The black coating composition according to any one of claims 11 to 14, which
20 has an optical density (OD value) of not less than 4.4 per $1\ \mu\text{m}$ of film thickness.

16. The black coating composition according to any one of claims 11 to 15, wherein the transmittance of i-ray when the optical density (OD value) is 2.0 is more than 0.2%.

17. The black coating composition according to any one of claims 11 to 16,
25 further comprising a compound having a siloxane bond and a carbon-carbon double bond in a single molecule and having no silanol group.

18. The black coating composition according to claim 17, wherein said compound

having a siloxane bond and a carbon-carbon double bond in a single molecule and having no silanol group has the structure represented by the following Formula (7):



(wherein each R^1 independently represents hydrogen or alkyl group; each R^2 independently represents an organic group containing amide bond, imide bond, ester bond or urethane bond; R^3 to R^6 independently represent alkyl group; and n represents an integer of 1 to 3.)

19. The black coating composition according to any one of claims 11 to 18, further comprising carbon black.

20. A resin black matrix obtained from said black coating composition according to any one of claims 11 to 19.

21. A color filter for liquid crystal displays, which color filter comprises said resin black matrix according to claim 20.

22. A liquid crystal display comprising said color filter for liquid crystal displays, according to claim 21.